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Spring Creek

Summary of 2015 Surface Water Monitoring Program Results
Washington State Department of Agriculture
Natural Resources Assessment Section
September 2016

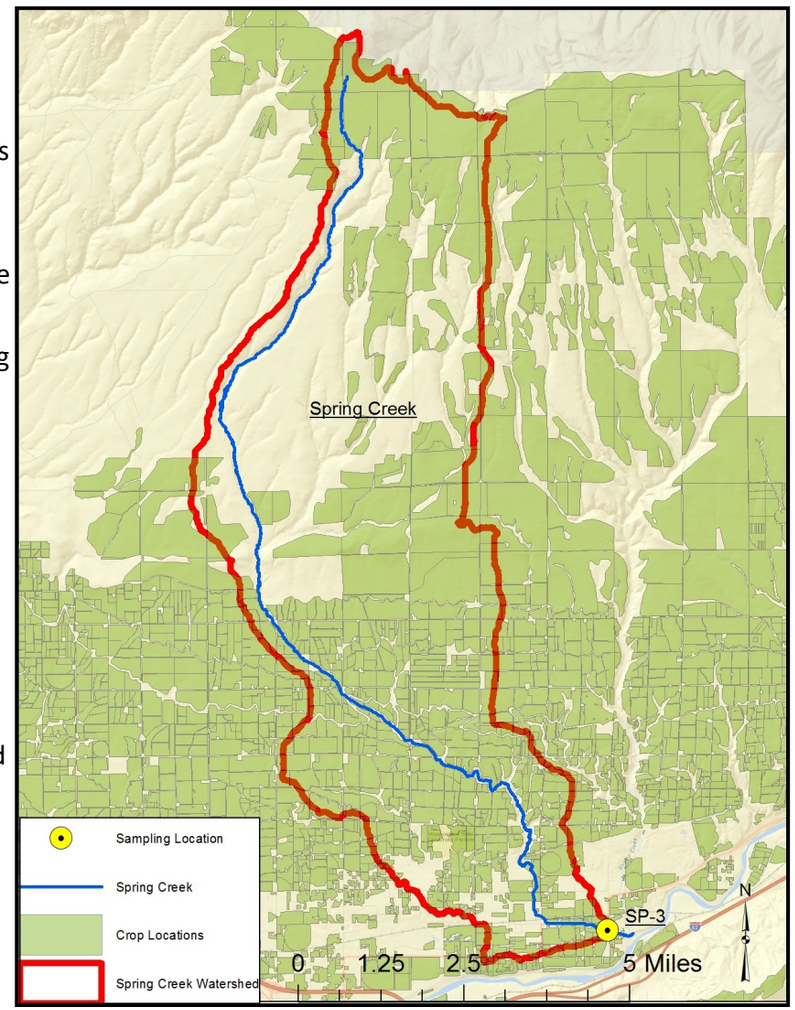
Introduction

The Washington State Department of Agriculture has monitored pesticide concentrations in surface water throughout the state since 2003. WSDA staff take water samples during the typical pesticide use season (March through September). In 2015 WSDA monitored 14 sites in Washington, three of which are in the Yakima River watershed. State and federal agencies use this data to evaluate water quality and make exposure assessments for pesticides registered for use in Washington State.

Study Area

WSDA has tested water from Spring Creek from 2003 through 2015. The watershed drains about 20,800 acres of farmland. The main crops are wine grape, wheat, hops, and juice grape. The lower reach of Spring Creek provides habitat for chinook, coho, and steelhead*. A fish passage blockage restricts the salmon from migrating beyond its crossing with Hess Rd. At times during the irrigation season water is released from the Sunnyside Canal into the creek.

* Washington State Department of Fish and Wildlife



Sampling Details

- Samples were collected for 25 weeks, from March 9 through August 24.
- Water samples were tested for 206 chemicals: current and legacy insecticides, herbicides, fungicides, rodenticides, wood preservatives, and pesticide degradates.
- Sample analysis for pesticides and total suspended solids was conducted at Manchester Environmental Laboratory in Port Orchard, WA.
- General water quality parameters; dissolved oxygen, conductivity, pH, water temperature, and streamflow were measured at every sampling event.
- Air and water temperature (measured every 30 minutes) was monitored for the entire sampling season.
- For a short period of time, 5 weeks, additional water samples were collected and analyzed for glyphosate and its degradate, AMPA.
- Drought conditions resulted in less than normal streamflow throughout the season.

This table shows the pesticides detected, with dates and concentrations. They are color coded to identify which assessment criteria were surpassed. The assessment criteria used here are state and federal water quality criteria, reduced by half for safety. This 0.5 safety factor is used to make sure the criteria protect aquatic life and water quality issues are found early. Watersheds with detections above the criteria are prioritized for more monitoring and educational outreach. See http://agr.wa.gov/PestFert/natresources/SWM for more information.

Assessment Criteria
May affect fish survival at sensitive life stages
Additional level of protection for endangered species
May affect invertebrate survival
Nearing a pesticide state water quality standard
May affect fish growth or reproduction with prolonged exposure
May affect invertebrate growth or reproduction with prolonged exposure
May affect aquatic plant growth
May affect aquatic plant growth or reproduction with prolonged exposure
Below all identified criteria
No published criteria available
Not detected (below detection limit)
No Data – –

Month and Day		Mar				Apr				May				Jun					Jul				Aug			
Analyte Name †	Use‡	9	16	24	30	6	13	20	27	4	11	18	26	1	8	15	22	29	6	13	20	27	3	10	17	24
2,4-D	H		.051					.078	.083	.069	.073	.16	.064	.082					.043	.047						.037
4,4'-DDE	D-OC																							.01		
AMPA	H									.093	.098															
Boscalid	F							.076								.034		.042	.036		.032					
Bromacil	H		.11					.06																		
Captan	F																								1.0	
Carbaryl	I-C							.012		.01																
Chlorpyrifos	I-OP		.051	.085	.11	.031		.028																		
Dicamba	H											.12		.024												
Dichlobenil	H	.005	.011	.013	.014		.012																			
Diuron	H	.072	.215	.068		.015	.015	.049	.012	.012		.028	.02	.008	.006	.008	.005	.11	.008	.011		.006	.005	.005	.008	.006
Glyphosate	H	--	--	--	--	--	.21	.12	.21	.28	.17	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Imidacloprid	I-N							.015																		
Isoxaben	H		.005				.003	.002		.003									.005							
Myclobutanil	F							.006							.006											
DEET	IR													.029												
Pyraclostrobin	F	.014																								
Pyrimethanil	F											.023														
Triclopyr acid	H											.068														
Temperature	N/A	51.26	56.44	54.00	58.66	53.74	58.53	**65.03**	**63.86**	**67.21**	**65.61**	**64.06**	**74.44**	**75.60**	**77.77**	**72.23**	**73.13**	**79.00**	**83.53**	**78.66**	**82.99**	**68.05**	**72.59**	**73.06**	**74.64**	**72.84**
Dissolved Oxygen	N/A	11.59	11.04	10.58	10.06	10.75	11.16	10.02	9.7	9.01	9.18	9.32	8.36	8.68	9.89	11.72	10.48	**7.87**	**7.38**	8.3	**7.9**	9.56	8.87	9.54	10.11	10.44
Percipitation	N/A	0	0.73	0.03	0.26	0.07	0	0	0	0	0	1.4	0.06	0	0	0	0	0	0	0	0	0	0	0	0	0
Streamflow	N/A	9.1	11.8	64.8	40.1	62.2	3.6	28.4	31.4	25.7	17.1	59.5	15.1	36.8	1.0	0.9	1.0	2.5	1.2	1.8	1.9	1.4	1.4	1.8	1.3	2.1
Total suspended solids	N/A	25	29	79	45	24	5	23	27.5	24	20	35	9	18	< 1	< 1	2	11	2	6	2	3	3	3	2	1

‡ C: Carbamate, D: Degradate, F: Fungicide, H: Herbicide, I: Insecticide, IR: Insect repellent, L: Legacy pesticide, M: Multiple, N/A: Not applicable, N: Neonicotinoid, OC: Organochlorine, OP: Organophosphate. †Units are as follows: pesticides, µg/L; temperature, °F; dissolved oxygen mg/L; percipitation, week total inches; streamflow, cfs; and total suspended solids, mg/L. **Bold**: Indicates a temperature or dissolved oxygen value above state water quality standards.

Results Summary

- There were a total of 76 detections, 7 of which were at concentrations above assessment criteria.
- A sample collected in August showed levels of 4,4'DDE, a degradation product of DDT, was found at a concentration nearing the Washington state water quality standard. DDT products are no longer registered for use, but detections such as these are attributed to their persistence in the environment and ability to bind to soil particles.
- A sample collected in August contained levels of captan that may affect aquatic endangered species.
- Five samples collected in the spring had chlopyrifos concentrations at levels which may effect intvertebrate survival. Common products containing chlorpyrifos are Lorsban and Dursban.
- Chlorpyrifos is currently a pesticide of concern in Washington. It has been detected above assessment criteria at two other Yakima River tributaries, Marion Drain and Sulfur Creek Wasteway.

Recommendations

- Eliminate drift and runoff to adjacent surface water.
- Maintain, inspect, and calibrate application equipment
- Continue implementation of best management practices, including conservation buffers, vegetative filter strips, sediment basins, and setbacks from water. Detections of DDT and it's degradates are closely associated with total suspended solids originating from soil erosion.